

REMARKS

Claims 6-10 have been submitted for examination. Claims 6-10 have been rejected as being obvious over Setzer et al '746 in view of Olah.

The specification has been objected to by the Examiner but the reason for the objection has not been explained by the Examiner. Page 2 of the Office Action presents a "reminder" of the contents of an abstract. We would point out to the Examiner that the abstract in this application is the exact same abstract in the issued '836 patent noted above. We submit that there is nothing objectionable about the abstract in the patent or in this application. Should the Examiner think otherwise, than we request that she be more specific than she was in the initial office action.

On page 2 of the Office Action, the Examiner also states that a "system" is not a statutory category of invention. This is clearly erroneous. "Systems" which are composed of a number of constituents or components and have utility are clearly patentable subject matter. The claims in the instant application are directed to the system shown in Fig. 1 of the application and clearly and succinctly describe the utility of the system in question. The Examiner is not free to "determine" that the claims are directed to something else, as she claims to have done on page 2 of the Office Action. The Examiner's attention is directed to: Diamond v. Chakrabarty, 206 USPQ2 193 (1980) wherein the Court stated that "anything under the sun that is made by man" constitutes patentable subject matter.

The §103 Rejections

A) Claims 6-10 stand rejected as being obvious over Setzer et al '746 in view of Olah.

The use of the Olah reference as a disclosure of the fact that hydrogen is produced in a fuel cell power plant is redundant and unnecessary. Of course hydrogen is derived from natural gas, or it is derived from a source of pure hydrogen in operating a fuel cell power plant. We will ignore the Olah reference in the following arguments, and, of course, we will concede that hydrogen is necessary for the operation of a fuel cell power plant.

On page 4 of the office action, the Examiner offers comments regarding "limitations recited in claim 6 which are directed to a manner of operating disclosed device, neither the manner of operating a disclosed device nor material or article worked upon further limit an apparatus claim. Said limitations do not differentiate apparatus claims from prior art." (citing the MPEP). The Examiner further states that: "Further, process limitations do not have patentable weight in an apparatus claim.", citing Ex parte Thibault, a board of appeals decision dating back to 1969.

What are the alleged "manner of operating" limitations that are supposedly recited in Claim 6? The Examiner has not pointed out what she thinks they are. Where does the Examiner think she sees "process limitations" in Claim 6? The Examiner has not pointed out where she thinks they are. It is unclear to us whether the Examiner is referring to functional limitations which are contained in Claim 6, or some other types of limitations. Please clarify this point in the next office action.

In analyzing the contents of the Setzer et al reference on page 3 of the office action, the Examiner has referred to the conversion by Setzer of gasoline or diesel fuel to a low sulfur content fuel. JP-4 fuel is jet fuel, not gasoline or diesel fuel.

In the last paragraph on page 3 of the office action, the Examiner alleges that the amount of H₂ obtained from the reformer in Setzer et al will be present in an amount to produce an effluent fuel stream which contains no more than about 0.05 ppm sulfur. Then in Para. 2 on page 4, the Examiner contradicts herself by stating that: "The reference does not disclose the addition of H₂ in an amount which is effective to provide an effluent fuel stream at an exit end of said nickel reactant station which effluent fuel stream contains no more than about 0.05 ppm sulfur.". The fact of the matter is that in Setzer et al the desulfurized fuel has a sulfur content of about 20 ppm (Col. 3, line 16). This point will be further addressed below.

The Examiner states on page 4 of the office action that, there are a number of differences between the applicants' claimed invention and the contents of the Setzer et al reference. These differences, as characterized by the Examiner, are: a) the reference does not disclose the conversion of organic sulfur compounds to nickel sulfide; b) the reference does not disclose a method for reducing the amount of sulfur in a fuel to no more than 0.05 ppm; c) the reference does not disclose a system wherein hydrogen added to the fuel stream is derived from a container of hydrogen; d) the reference does not disclose a system wherein hydrogen added to the fuel stream is derived from recycled reformed fuel gas from a selective oxidizer; e) and the reference does not disclose a system wherein hydrogen added to the fuel stream is derived from an electrolysis cell.

The aforesaid observations by the Examiner relating to the Setzer et al reference are essentially correct. The nickel sulfide conversion observation is, however, believed to be incorrect. We concede that the sulfur compounds in the JP-4 jet fuel would be converted to nickel sulfide in the nickel reactant bed described in the reference. Also, the observation by the Examiner that the reference does not suggest the addition of hydrogen to the fuel stream from a container of hydrogen is clearly incorrect, see Col. 3, lines 67-70 of the reference.

The statement on page 5 of the office action by the Examiner that the reference renders obvious the derivation of hydrogen from recycled reformed fuel gas from a selective oxidizer in the fuel processing section of a fuel cell power plant is clearly erroneous. Likewise, the allegation by the Examiner that the derivation of hydrogen from an electrolysis cell is rendered obvious by the Setzer et al reference is clearly erroneous. Nothing in the cited prior art suggests the derivation of hydrogen from either recycled reformed fuel gas from a selective oxidizer, or from an electrolysis cell. The Examiner's attention is directed to the fact that selective oxidizer exhaust of reformed fuel gas is a byproduct of the operation of a fuel cell power plant which presently goes to waste. Likewise, water is a byproduct of the operation of a fuel cell power plant which is not presently used in an electrolysis cell as source of hydrogen that can be used to enhance operation of the fuel cell power plant.

On page 5 of the office action, the Examiner states that the Setzer et al reference discloses the use of steam to prevent the formation of coke on the nickel particle bed. This is true. The Examiner further states that H₂ is a component of steam. This latter statement is completely false. H₂O (water) is a component of steam, not H₂ (hydrogen).

0.05 ppm sulfur in the effluent: All of the claims in the instant application require that the effluent fuel stream exiting the desulfurization bed contain no more than about 0.05 ppm sulfur. The Examiner has addressed this limitation by alleging: "It would have been obvious to one having ordinary skill in the art at the time the invention was made to utilize a system wherein the addition of H₂ in an amount which is effective to suppress carbon deposition on the nickel reactant and provide an effluent +++ which effluent fuel stream contains no more than about 0.05 ppm sulfur because the Setzer reference discloses that a desulfurization process run with no water or hydrogen resulted in coke formation and therefore hydrogen could be expected to be effective in reducing coke formation.". What Setzer et al actually discloses regarding the degree of desulfurization is that 20 ppm is an acceptable "trace" amount of sulfur. The claimed subject matter in this application requires a sulfur content of 0.05 ppm in the desulfurized effluent stream.

The difference between the acceptable amount of sulfur in Setzer et al, and the acceptable amount of sulfur in the claimed subject matter is a multiple of 400, i.e., 20 ppm sulfur is ~~400~~ times 0.05 ppm. There is no suggestion in Setzer et al (which describes a 30 year old desulfurization technology) that the Setzer et al technique is even capable of achieving an effluent of 0.05 ppm sulfur, and the reference does not suggest that such an effluent is necessary or desirable. The Examiner's implication that if the 20 ppm sulfur content is achievable, then the 0.05 ppm sulfur content is achievable using the Setzer teachings is erroneous and is not supported by the reference in question. Note that this §103 rejection

is based on only a single reference, which does not suggest the desirability of, or support for the Examiner's contentions as to sulfur scrubber effluent sulfur content. Note that the reference does not suggest that there is any problem with a sulfur scrubber effluent which contains 20 ppm sulfur. Stated simply, Setzer does not motivate anyone of skill in the art to strive to reduce the amount of sulfur in the fuel to 1/400 times 20 ppm, i.e., 0.05 ppm which is required by the claims in the instant application.

In summary, there is absolutely nothing in Setzer et al that renders obvious the claim limitation in the instant application of "said H₂ additive being present in said gasoline fuel stream in an amount which is effective to provide an effluent gasoline fuel stream at an exit end of said nickel reactant station which effluent gasoline fuel stream contains no more than about 0.05 ppm sulfur". Furthermore, Setzer et al does not relate to the desulfurization of gasoline; Setzer et al does not suggest the derivation of hydrogen for use in its process from recycled reformed fuel gas from a selective oxidizer in the fuel cell power plant; and Setzer et al does not suggest the derivation of hydrogen for use in its process from an electrolysis cell; nor does Setzer et al suggest the derivation of hydrogen from a hydride bed.

We believe that Olah is essentially a redundant reference and thus have not specifically addressed that reference. It is common knowledge in the art in question that hydrogen is necessary for the operation of a fuel cell power plant as a source of free electrons needed to produce electricity, and that it is either derived from a source of pure hydrogen or from a catalytically reformed fuel gas stream.

We submit that the rejections of Claims 6-10 are clearly erroneous and should be reconsidered and withdrawn. Early notice that this application has been passed to issue is courteously requested.

Respectfully submitted,



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